

EXPRESS MAIL
ET490421606US

TITLE

GOLF CLUB CLUBHEAD AND GOLF CLUB HEAD COMPONENT WITH
MARKINGS DETERMINED IN CONJUNCTION WITH THE BALANCE PLANE WITH,
AND WITHOUT, PARALLAX CORRECTION TO BE USED FOR ALIGNMENT AND
VISUAL AID PURPOSES, WITH TOOLS, MARKINGS, METHODS FOR LOCATING SAME
TOGETHER WITH METHODS OF USING SAME.

EXPRESS MAIL
ET490421606US

CROSS REFERENCES TO RELATED APPLICATION(S)

GOLF CLUB CLUBHEAD AND GOLF CLUB HEAD COMPONENT WITH MARKINGS DETERMINED IN CONJUNCTION WITH THE BALANCE PLANE WITH, AND WITHOUT, PARALLAX CORRECTION TO BE USED FOR ALIGNMENT AND VISUAL AID PURPOSES, WITH TOOLS, MARKINGS, METHODS FOR LOCATING SAME TOGETHER WITH METHODS OF USING SAME

This Application is a Continuation In Part of Application 09/797,357 which was a Continuation In Part of Application 09/225,101 now US Patent #6,224,494.

**GOLF CLUB CLUBHEAD AND GOLF CLUB HEAD COMPONENT
WITH MARKINGS DETERMINED IN CONJUNCTION WITH THE
BALANCE PLANE WITH, AND WITHOUT, PARALLAX CORRECTION
TO BE USED FOR ALIGNMENT AND VISUAL AID PURPOSES, WITH
TOOLS, MARKINGS, METHODS FOR LOCATING SAME TOGETHER
WITH METHODS OF USING SAME**

Arrangement and contents of the Specification

Item	Page(s)
a. Title of the Invention.	T 1
b. Cross References to Related Application(s).	CR 1
c. Statement as to rights to inventions made under Federally-sponsored research and development.	none
d. Background of the Invention.	B 1-14
e. Summary of the Invention.	S 1-21
f. Brief Description of the Drawing(s).	BDD 1-11
g. Description of the Preferred Embodiment.	P 1-13
h. Claim(s).	C 1-29
I. Abstract of the Disclosure.	A 1

TITLE

GOLF CLUB CLUBHEAD AND GOLF CLUB HEAD COMPONENT WITH MARKINGS DETERMINED IN CONJUNCTION WITH THE BALANCE PLANE WITH, AND WITHOUT, PARALLAX CORRECTION TO BE USED FOR ALIGNMENT AND VISUAL AID PURPOSES, WITH TOOLS, MARKINGS, METHODS FOR LOCATING SAME TOGETHER WITH METHODS OF USING SAME.

This Application is a Continuation in part of Application 09/797,357 which was a continuation in part of Application 09/225,101, now US Patent #6,224,494.

BACKGROUND OF THE INVENTION

Since the beginning of golf in the 1400's, Golf club manufacturers say there is a Sweet Spot and Center Of Gravity on clubheads that has been understood, assumed and accepted by all golfers, but why haven't they told us golfers where that Sweet Spot is designed for, to hit a ball off the Ground or perched on a Tee? Wherein this disclosure unveils and tells golfers how this is to be accomplished.

Golf club manufacturers and golfers have been trying, but unable to solve golfs 600 year old riddle of hook and slice, wherein they lay awake at night trying to figure out how to hit a golf ball straight...until now.

A Golf Club, Golfclub, Club, or Clubhead, is considered complete with all of its components, Grip, Shaft and Head. A Club head is a component part of a Golfclub.

The past recorded knowledge and recognition of a clubhead having a center of percussion, otherwise known as a Sweet Spot, and a Center Of Gravity will be proven to be not applicable

because it does not take into consideration the shaft and the grip, which is antiquated, and circumvented by this patent, which divulges the existence of a Golf clubhead Sweet Line containing two main points at which to strike a ball, or Two Sweet Spots, and its associated derivatives, found by the use of a balance plane.

There are four basic categories to improve playing golf, the golfer, their equipment, technique and prayer. Their search for the correct equipment, or the ultimate golf club, is like looking for the needle in the haystack, or that one Sweet Spot on a clubhead with which to hit the ball. In the past, there has been no correct method of finding, understanding or knowing how to use this Sweet Spot on a golf club, until now.

The Golf club strikes a ball at a master reference point called the Ball Impact Point, which can be a variable dependant upon the club design or use, and in regards to basically two ball height positions, being a ball on the ground and/or a ball on a tee.

A golf clubhead is like a wrecking ball which has a cable or chain that controls three basic parameters, speed, power and direction, with the wrecking ball doing all of the work. A clubhead does more, it controls loft, tilt, ball spin, direction, control, etc.. The clubhead works in conjunction with the shaft whereas the wrecking ball is independent of the cable or chain. A golf clubhead is similar to an airplane. During landing the airplane wings must always be parallel to the ground. Likewise a golf clubhead must be in the specific design position.

A golf club is similar to a humans leg, the Grip vs. Thigh, Shaft vs. Calf, and the Clubhead vs. Foot, whose clubhead comparison consists of a Toe, Heel and Sole. If a foot is not soled properly it will affect ones ability to walk, likewise if the clubhead is not soled properly, a change will occur altering the characteristics of the clubhead, as this disclosure will explain. Likewise, a clubhead is also comparable to a barbell that has a Sweet Spot and a Center Of Gravity, wherein if

one end of the barbell is lifted higher than the other end, the sweet spot and center of gravity changes. Therefore, if the clubhead Toe or Heel goes up, it alters the soling and moves that now questionable sweet spot one way or the other, causing miss hits.

All golf clubs to date have round bases to accommodate the majority of golfers lie angles.

Forward Press, or Positive Press, is the tilt of the shaft positioning leaning towards the target or hole, normally from center body, allowing the shaft to be more in line with the golfers forward arm. Forward Press keeps the forward wrist straight which can be adapted to specific golf clubs to create a Press Rhythm resulting in similar setup and use that provides optimum power, control and direction between all clubs. Reverse Press or Negative Press is the movement or the tilt of the shaft away from the target. Press Deviation is more detrimental to the golfer than Lie Angle Deviation. Press is measured in inches, mm or degrees.

Hooding is the instability of the clubhead causing it to wobble, flounder or flop over, resulting in the opening or closing of the clubhead face, when it is not in its designated position or limits that are designed basically for lie or press angles. Hooding affects are related to the soling of that clubhead, which is more prolifically felt when soled on a smooth flat surface, compared to being on a rug or grass. All clubheads produced have curved or arced bases with a soled radius, like a seesaw or rocking chair, to generically fit every golfer, that gives the illusion of identical soling, whereby changing the sweet spot location, without necessarily Hooding. Hood design in clubheads will alert the golfer that a parameter change exists, that will alter the ball striking characteristics of the clubhead, so that he may make necessary adjustments. This patent is also applicable to all clubhead bases that are of such a curved nature or otherwise, that can incorporate an Automatic Hood feature.

This inventor has established Three Triangles in golf, the Stance Triangle, the Alignment

Triangle, and the Club Triangle, that can affect the Sweet Line and dependency upon the Ball Impact Point.

These triangles are generally applicable in life and sports, such as baseball, golf, bowling i.e..

The Stance Triangle requires the ball, golf club and player be in a referenced and repeatable position. This triangle is derived from three points, the Ball Impact Point, the positioning of the grip top with the players hand or Press, and the distance from the players forward foot tip to the imaginary ball traveling line called the Foot distance. The perpendicular distance from the tip of the forward foot to a projected clubhead face line is called the Ball distance. Each individual club has its own characteristics that the golfer must adapt in his Stance Triangle for that club, requiring reproducibility each time that club is used, otherwise the Sweet Line changes. This triangle will always remain the same when the ball, and the golfers feet are on the same plane, but, If they are on different planes, then the Stance Triangle must change.

The Alignment Triangle requires the ball, golf club and player in position. This triangle is derived from three points, the Ball Impact Point, the Foot distance and the positioning of the bridge of the golfers nose. This triangle is used to align the clubhead and Ball Impact Point in relationship to the target.

The Club Triangle is derived by three dimensions, length and two plumb bob measurements, when the clubhead is in its intended position. The length of the club is normally measured along the shaft centerline from the grip top to a point on the ground with the golfclub in its' intended use position. The length of the club should be measured from the top of the grip to the clubhead base, vertically below the intended clubhead impact point, in consideration to the correct golf club intended use. A plumb bob hanging from grip, creates two distances, one from

the imaginary ball line, and the other from the club head face line. These triangular methods are used in conjunction with the golfers Stance Triangle, and applicable to the manufacture of custom clubs, club duplication, and to verify club parameters if it is suspected of being damaged, or otherwise. The clubhead soling is extremely important and will be analyzed and discussed later.

Iron Head face heights vary, by peaking adjacent to the toe, being angularly and diminishing in height, being flat or somewhat curved, and terminating at the heel or shaft. Whereas Wood Head tops are curved horizontally and peak near the toe or at the center above the head Sweet Spot. Both will be shown to be substantially improved.

Impact areas on Iron Head faces are flat, whereas Wood faces incorporate a curved horizontal face bulge and vertical face roll, having both identified with Sweet Spot markings. External to the impact areas, Woods and Iron Heads sometimes have alignment markings, referenced to the Head Center Of Percussion Sweet Spot or Center Of Gravity, which have been designed without taking into consideration the Grip and Shaft components, wherein, this patent does take into consideration these components.

Golf club shaft mounting into the head heel has moved from basically in line with the face, to ahead of the face towards the hole called Offset, wherein presented is the movement back, called Centerset, or having the shaft centerline referenced to the Two Sweet Spots, or opposite the head center.

Presented are the four states that an object resides in, Static State, Dynamic State, Dynamic Impact State and Dynamic Impact Aftermath State.

In a Static State, any instrument, including a baseball bat, golf club or Head component, having no motion, and not subjected to external forces, are only affected by gravity. In this state, all objects, Symmetrical and Nonsymmetrical have a Center of Gravity. This patent is in

agreement, that on all Heads, without their shaft and components, and in their Static State, have a Center of Gravity from where a Sweet Spot can be deduced and identified. That a Head, Center Of Gravity and Sweet Spot is one thing, but components must be added to the Head to make a golf club, resulting in the golf clubs own Center of Gravity that is now in free space, caused by related club planes, axes and weighting, that must be taken into consideration to understand the design of the Two Sweet Spots, by its derivation and derivatives.

A Dynamic State is created when that instrument is subjected to external forces that causes it to move and defy gravity, as in the case of a complete golf club with all of its components being swung, that now takes into account Center Of Mass, Swing Plane and centrifugal forces. Thus, the past terminology relating to center of gravity will be replaced by Center Of Mass.

A Dynamic Impact State is created when that instrument or golf club in the Dynamic state strikes or hits an object in a Static or Dynamic State, such as a ball, that can be measured during contact, or dwell time, on both the instrument and struck object. When a Nonsymmetrical instrument, such as a golf club, is used in a Dynamic Impact State, gravitational forces are overcome and become virtually insignificant resulting in new phenomena and terminology, as will be described and discussed in this disclosure.

A Dynamic Impact Aftermath State occurs to both the instrument and struck object after contact is completed.

The Clubhead Swing Plane has been extremely skewed on past clubheads, that will be shown to have a prolific improvement.

A player swinging any instrument, whether a baseball bat or golf club, creates an extension of the Swing Plane with his arms and body, somewhat controlling any miss hits to an object by the

gripping power with his hands, but the instrument is still the prime controlling factor in the Dynamic Impact State, with the clubhead being paramount as the striking force.

Many years ago rifles had no gun sights for alignment purposes, but today all rifles, pistols and derringers have two gun sights that can also be adjusted to distance targets, so why not a golf club having Target Lines for alignment, and Two Sweet Spots to coincide to the two ball height distances, from the Ground or off a Tee.

INVENTION OBJECTIVES:

To introduce several novel features that is applicable to all existing and future classifications of instruments, especially golf clubs, that are intended to make contact with another object, ball or otherwise.

To establish and promote correct golf club use, and testing, through the understanding and knowledge of modern golf club design technology using the Sweet Line principles derived from a balanced plane within the clubhead.

To overcome the mandated Sweet Spot belief, known throughout the centuries, wherein on clubheads there exists only one singular sweet spot derived from a head center of gravity, and to unveil this myth by conveying to golfers that what actually exists is a clubhead balance plane having an angular Sweet Line with Two Sweet Spots for hitting a ball on the ground and off a tee.

To pass on to my fellow golfers, my twenty five years of frustration in golf before my father said "Your an Engineer...FIX IT!".

The following portion of the background has been added to the background submitted with Application 09/797,357.

Additional Background

For clarification purposes a club head (two words) is a component part used in the construction of a golf club, whereas clubhead (one word) is a part of a golf club having all components, including club head, shaft and grip, which will be referred to as such throughout this document.

Yes it's true, all component club heads have a center of gravity, or Sweet Spot, but what happens to this club head component Sweet Spot when the shaft and grip components are installed? This invention deals with the club head component and also a golf club comprised of all components. This invention also includes design improvements to the club head and golf club.

This inventor visited the United States Golf Association, USGA, on two occasions during the processing of patent 6,224,494, primarily for presentation purposes of his Balance Plane and Sweet Line design. This Balance Plane and Sweet Line design now Conforms to USGA rules. A tour was made of the USGA facility and the method of testing club head components called Coefficient of Restitution, or C.O.R., was observed, that measures the rebound ratio of a ball impacting a component club head center of gravity or Sweet Spot. Based upon observations made by this inventor during the visit I believe that the USGA never performed tests on an assembled golf club clubhead Sweet Spot nor Sweet Line, but rather on the club head component only. In the inventors eyes, true testing of a clubhead can only be made on a golf club with all components, and the designated Sweet Line. The inventor also recommended to the USGA that loft guide lines be established, wherein manufacturers have retained traditional golf club numbering but have altered the loft dramatically, thereby affecting the flight distance of a ball. This loft change falsely leads the unknowing golfer to believe that he hit the ball further with a golf club that has the same number as a traditional golf club. Loft alteration has also shifted the range of degrees thereby creating a multitude of newly identified golf clubs by the manufacturers.

This loft alteration and multitude of newly identified golf clubs is confusing to golfers.

The tilt of the Club Head face measured from vertical is called loft. It is difficult for a player to see the club head face surface when the club head has a small amount of loft. For instance the woods and irons with lower numbers have less loft than the woods and irons with higher numbers. When using a wood or iron with less loft the player has trouble seeing and aligning the club head Sweet Spot on the club head face surface, that is at the desired point for contact with a ball. Therefore for proper alignment it is desirable to locate a reference point or line on the club head face, top, or both surfaces that the player may easily see and use for proper alignment.

Traditionally Low lofted golf clubs have three points of alignment. The alignment of the golf club to a ball in a vertical plane, includes: 1. the clubhead face Sweet Spot; 2. a top clubhead marking vertically over the Sweet Spot (this marking is not used for all clubheads) (this marking is most important on clubs with a lower loft as the golfer can not see the clubhead face Sweet Spot and must rely upon this top marking); and 3. the players eyes.

High lofted golf clubs have two points of alignment. The alignment of the golf club to a ball includes: 1. The clubhead face Sweet Spot; and 2. The players eyes (because the golfer can see the clubhead face Sweet Spot or the spot that the player assumes is the geometric center).

Putters are low lofted and have a top clubhead mark in a vertical plane that is in coincidence with the face Sweet Spot. In putting it is believed that the golfers eyes must be in said vertical plane to correctly align their eyes to the putterhead top marking. The result is that the golfer's eyes are vertically over the face Sweet Spot, and therefore the golfer's eyes must be aligned to the ball impact point, in the direction of intent. Drivers also are low lofted and have top markings in said vertical plane directly above the face Sweet Spot, identical to a putter. But,

when using a driver the golfer's eyes are offset from this vertical plane because the golf club shaft length forces the golfer back away from said vertical plane, thereby creating parallax between the face Sweet Spot and top marking. Some low lofted golf clubs, including drivers, have no top markings leaving the golfer to rely upon the face, face curvature or the crown of the head for alignment purposes. One purpose of this invention is to provide more accurate markings in order that the golfer may cause the point of impact to be at the correct point with resulting maximum length of flight of the ball resulting in less dispersion, with improved ball Control, Accuracy and Precision (C.A.P.).

What clubhead feedback does a golfer obtain during a practice swing over a blade of grass, or actual swing into a golf ball, and how can it be improved? Clubhead feedback of past art golf clubs has been limited to the golfer seeing the clubhead go through as a blur or having the sole of the clubhead bounce off the turf hence leaving a mark that indicates the position the clubhead was in. This allows the golfer to prepare for his anticipated swing into the ball by making the necessary adjustments. One purpose of this invention is to improve Clubhead feedback.

The traditional past art regarding Club Head face Sweet Spot is that the focal point in the design of the face curvature comprised of both horizontal bulge and vertical roll. The Club Head face, when viewed from any angle, resembles an egg shell surface. Wherein, the traditional Sweet Spot is presumed to be the only point with the correct Loft angle and position that is intended to have the club head optimally hit a ball resulting in the ball traveling in the direction of intent with control, accuracy and precision. Any other location on the club head face surface is at a different loft and angular position that results in the deviation of the path of travel of a ball being struck. This deviation can be somewhat corrected by the golfer altering their position or the club head

position. This deviation can also be somewhat corrected by altering the manufacture of the club head face to be angularly closed or open.

Club heads, on Woods, are normally manufactured with a square face that is intended to be perpendicular to the desired path of flight of the golf ball when the club head makes contact with the golf ball or during the dwell time that the ball is making contact with the clubhead face.. It is also common for the manufacturer to make the club head with a closed face, or open face to accommodate the golfer for personal inconsistencies.

Due to the nearly egg shape of a traditional Golf Club Wood head face surface it is very difficult for a golfer to determine the exact point of contact that is desired. To locate that exact point the golfer finds himself relying on memory and instinct. This results in the golfer having the golf club head face surface make contact with the golf ball at points that are random and often incorrect, resulting in the balls performance being different than desired.

Some golfers tend to adjust the golf club to overcome a tendency that the golfer has to slice or hook. In a perfect world the golf club face surface should be essentially perpendicular to the path of flight that the golfer desires the golf ball to take, upon impact. If the golfer finds that the golf ball is consistently hooking or slicing, when a straight path of flight is desired, the golfer will adjust the golf club to have the golf club face surface at a slight angle off of the perpendicular to the desired golf ball path of flight. The individual golfer will do the adjustment depending on the correction desired. In some instances the golfer is trying to overcome not only an improper angle of the golf Club face surface in relation to the desired path of flight for the golf ball, but also an improper point of impact on the golf club face surface. In the foregoing situation the golfer should first confirm that the point of impact is the desired point of impact.

To avoid this inaccuracy and inconsistency it is the purpose of the present invention to

provide the golfer with markings on the club head face and top surfaces to act as visual aids to assist the golfer.

Balls hit at any point on a clubhead face surface can be plotted as a skewed bell curve.

Traditionally Golf Club components, such as the Club head, Shaft and Grip, are individually designed and then assembled together as a unit that results in a Golf Club. Several novel modes and variations could be considered in the design of a Golf Club that facilitates and incorporates all components including even the Golfers body and the Golfers Swing Plane.

In past art the Maximum Club Head Face Height on any Golf Club is found only between the club head Toe and the center of the club head face Sweet Spot, commonly known as the center of gravity, geometric center or otherwise, whereas novel art relocates the Maximum Club Head Face Height at or from the club head center to the heel.

During the past several hundred years Golfers have been assuming that there was one and only one location on all Golf Club Head face surfaces, referred to as the Center of Gravity and commonly called the Sweet Spot. Even the inventor assumed that there was only one point or Sweet Spot that would optimumly hit a ball. The inventor always had trouble with drivers and relied upon his three wood for improved accuracy and control of hitting a ball from either the ground or tee. At one time the inventor noticed that his three wood would hit a ball on the ground perfect every time, but when the ball was hit off a tee he would slice sixty percent of the time. His remedial action was to close the clubhead face when the ball was on the tee, and he wondered why this was happening and what he was doing wrong. The inventor now knows the answer to this question and will enlighten his peer who reads and understand this Patent. The assumption has been that the Sweet Spot is the ideal point of contact for the Club Head with the Golf Ball. One problem with the traditional Sweet Spot is that the location of the traditional

Sweet Spot is determined as to the Club Head Component, only, without taking into account the shaft and grip that will be added to the Club Head Component for actual use. This assumption has been relied on by manufacturers and Golfers, without taking into account a true understanding of the engineering principals involved. The fact of the matter is that when the shaft and grip are added to the Club Head Component the point of ideal contact, or Sweet Spot, is relocated and in fact becomes a diagonal line on the Golf Club Head face surface. This assumption has lead Golfers to further assume that they would be compelled to raise the Club Head, and its assumed Sweet Spot, vertically to make contact with a Golf Ball, at the same point of impact, for a Golf Ball that is on a Tee as opposed to being on the ground. The fallacy of this assumption lies in the fact that what actually exists on all golf clubs is a Balance Plane with a leading edge that forms a diagonal line on the Golf Club Head face surface, the inventor calls the Sweet Line, that contains multiple ideal points of contact with a ball. Therefore the Golfer must move the Club Head forward, in the toe direction, as the Golf Ball is raised from the ground by a Tee or other means, to have the appropriate ideal point of contact on the Golf Club Head face surface make proper contact with the Golf Ball. The Sweet Line does contain one point, the inventor calls the True Sweet Spot, that will optimumly hit a ball compared to any other point on the Sweet Line. Alas, the True Sweet Spot is not a constant but a variable that is primarily dependant upon club head speed with related shaft deflection.

A golf club is comprised of three major components, the grip, shaft and club head. It was assumed, up to the last decade, that a golf club clubhead did all the work impacting a golf ball, and that the shaft and grip had nothing to do with it. Several years ago it was disclosed that if the seam of the shaft was aligned in a particular orientation the ball would go further. This Patent reveals that any individual golf club component being designed, for example the club head

component, is dependent upon all associated components and in order that the ball may go further and with less dispersion. In the design of a golf club component, consideration of other prime factors such as length, size and weight must be taken into account. When the golf club is assembled, the traditional club head component face Sweet Spot transforms into a line or Sweet Line on the face of the clubhead. This inventor substantiated through static and dynamic robotic testing that a ball hit on the Sweet Line would go further, and with less dispersion, than a ball hit on the traditional Sweet Spot. Conversely, present day manufacturers art dwells in locating the traditional Sweet Spot and then designing the club head component. The problem with this approach is that the shaft and grip must still be added to complete the golf club. When the golf club is a complete unit the location of the Sweet Spot is shifted and in fact is a diagonal Sweet Line. Likewise, custom club fitters assemble golf club components without the knowledge nor understanding of the engineering principles involved that truly affects golf club performance and use.

This invention reveals a novel tool that can be used to find the optimum point(s) on a golf club clubhead face Sweet Line, or golf club head component Sweet Spot, or on a golf club with a traditionally designed head .

SUMMARY OF THE INVENTION

This patent does not take into consideration, nor is necessarily concerned with, prior patents, nor any other documentation, discussing, and interpreting a Sweet Spot as being the point at which to hit a golf ball. The Sweet Spot has also been interpreted as that One Singular Point, Center of Gravity, Center Point, Geometric Center, Center of Compression, Point of Compression, Center of Percussion, Impact Point, etc., which past golf club design concepts and principles were based upon, that are hereby repudiated, and justifiably so, by this disclosure.

This patent encompasses new engineering design principles in golf clubs, their manufacture and fitting, applicable to alignment markings and identification at any clubhead location, on or within the clubhead, adjustable or fixed, within or external to the impact area as defined by the USGA or other entities, visual or nonvisual, color coded, blended or otherwise, singular or plurality, and in any mannerism, allowing the golfer to automatically and exactly align the clubhead to a ball at any height, but basically at two heights, from the Ground or perched on a Tee, whereupon at ball impact results in the transferral of optimum power, control and direction of intent. In order to accomplish this, correct soling of the clubhead base should be made but is not necessary.

This present invention applies to all Symmetrical and Nonsymmetrical instruments that are used to hit an object. A comparison will be made between two instruments, a Symmetrical baseball bat and a Nonsymmetrical golf club, that are used to hit an object baseball or golf ball, to simplify the understanding of the mechanics and physics principles involved in their operation and

differences, wherein both have a Swing Plane and other similarities.

A golf club has a Swing Plane, that projects through the clubhead called the Clubhead Swing Plane and whose Perimeter Line is called the Bernie Line. The Swing Plane also facilitates a Swing Plane Arc, Swing Plane Radius, Swing Plane Radius Length, and Center Of Mass Axis. The Bernie Line is the missing link in clubhead design that opens a new door in golf, wherein evolves many new reference derivations that will be identified and easily understood through analogies in this disclosure. The Clubhead Swing Plane can result in being much less skewed in this endeavor.

Each clubhead has its own individual Bernie Line that consists of three major subdivision lines, Sweet Line, Target Line and the Training Line.

The Sweet Line is located angularly on the clubhead face that contains the Central Axis Of Power offering a number of Infinite Sweet Spots that subdivides into Six Sweet Spots called the Maximum Sweet Spot, Optimum Sweet Spot, True Sweet Spot or Huzza Point, Ground Sweet Spot, and the Tee Sweet Spot. The Six Sweet Spots can be interrelated. The Sweet Line and the Balance Plane may not be symmetrical.

The True Sweet Spot is associated with clubheads designed to hit a Ball Impact Point, primarily from one reference point, such as the ground, that can be any combination of the Six Sweet Spots, or of a general independent or reference nature. The True Sweet Spot can be used to strike a ball at another height if the club lie angle is altered. The True Sweet Spot is a variable.

The Sweet Line, and derivatives, can be installed on clubhead faces incorporating bulge, roll, curved, flat, otherwise or any combination thereof. Examples, the Sweet Line can incorporate bulge and roll, being called Sweet Line Angular or Diagonal Face Bulge and Sweet

Line Angular or Diagonal Face Roll, or having a Flat Sweet Line with the remainder of the face incorporating bulge and roll, or be flat faced, etc.

The angled Sweet Line is primarily referenced to two ball height resting locations, that being on the Ground or perched on a Tee, respectively called the Ground Sweet Spot and the Tee Sweet Spot, resulting in the term Two Sweet Spots, that are laterally apart necessitating a lateral movement of the clubhead alignment to the ball, that is dependant upon clubhead soling.

The available length on the Sweet Line to efficiently hit a ball at these two ball heights is measured from the Maximum Sweet Spot to the Ground Sweet Spot, or the Tee Sweet Spot, being respectively called the Ground Hit Line or the Tee Hit Line, that is also respectively measured vertically from the ground and called the Ground Sweet Spot Height and Tee Sweet Spot Height. The nonavailable area to hit a ball on the Sweet Line is called the Ground Dead Line or Tee Dead Line.

The Two Sweet Spots, Ground Sweet Spot and Tee Sweet Spot, can then be translated into vertical lines, or otherwise, on or external to the face impact area, being respectively called the face Ground Vertical Line and Tee Vertical Line, that can have the face grooves or markings referenced and designed accordingly.

From the Ground Vertical Line and Tee Vertical Line we can then derive top clubhead markings respectively called the Ground Target Line and Tee Target Line directions, that results in the Automatic Alignment and aiming of the clubhead to the ball with the direction of intent to the target, thus being referenced to the two ball heights.

Color coding can then be adapted with the Ground Target Line identified in green as the color of grass, and the Tee Target Line identified in white as in the standard color of a tee,

whereby both visually indicates, and correlates to the golfer, instant and complete Color Coded Target Alignment for ball height and direction. These target direction lines can be referenced to the Target Line but may, or may not be parallel nor in straight lines, depending upon clubhead design and construction.

The Training Line, or associated lines, can be identified on the nonvisual, bottom or backside portion of the clubhead, that when inverted into the bag identifying that club as having the Bernie Line concepts, and is also used in club design, swing analyzing, training aid, etc..

The aforementioned information is applicable to all clubheads, but, if the clubhead is not soled properly, a change in the Sweet Line angulation, being either more vertical or horizontal will affect all other associated parameters, and the use of the club. To correct this situation, clubs may incorporate different parameters such as lie, press, etc., that can be generically produced within these confines by the manufacturers, or be fitted exactly to the golfers individual Sweet Line derivatives. Once a Sweet Line and its derivatives are fitted to a golfer, the odds are against anyone else using that club. Unfortunately, all past clubs have been difficult to exactly fit to a golfer because their sole is cambered, arced, soled radius, etc., which may seem flat, but is actually an illusion.

Each club can be optimized in use by having repeatable Flat Base soling, along with other parameters, that establishes correct face orientation and alignment of the club to the ball and target, in reference to the golfers position. By having a Flat Base clubhead, fitted to the golfers Stance Triangle with a constant Sweet Line, results in optimum benefits to the golfer, but only if that flat soling can be felt to change when not flat, that alerts the golfer that the Sweet Line has changed.

Thus, a further improvement of the Flat Base is to connect a Hood Point which is sharp, or curved at the toe or heel, that becomes Automatically Hooded when used in a mannerism in which it was not designed for. Hence, when another golfer tries to use that club in their own Stance Triangle it becomes Automatically Hooded. A Hood Limit prevents the clubhead from completely flopping over.

Golf clubs that are design to hit a ball at one height that's on the Ground coinciding with a True Sweet Spot, can facilitate a Second Base to allow hitting a ball off a Tee with Automatic Loft.

A Heel Base further allows the golfer to broaden the Two Sweet Spot and the Lateral Displacement of the club, conversely a Toe Base brings the Two Sweet Spots closer together reducing the Lateral Displacement. Either bases can be used for an uphill or downhill lie.

Moving the shaft position physically back in the clubhead, away from the face, opposite the clubhead center or any proximity thereof, is called Centerset, that can be used in clubhead weight distribution balancing.

Golfer eyes position, in relationship to the ball or clubhead, are normally found between vertical, and to an angular displacement of approximately thirty degrees. Conventionally woods, for example, have their crowned shaped head tops basically parallel to the ground, wherein if the Ground Target Line and or Tee Target Line are identified on these clubheads they will be distorted to the golfers eyes due to parallax and depth perception. This can be overcome with an EyeAligner that has the clubhead top, or an alignment mechanism, that faces the golfers eyes squarely, enabling him to automatically align to the ball.

The height of a clubhead face need not ever be higher than the equator of the ball, taking

into account the balls compression and slip, loft, height, etc., unless the clubhead contacts the ground first. The height, or valley, can be concentrated in any mannerism to the Sweet Line, and called Sweet Spot Peak, that locates the optimize height of the clubhead or face with which to hit a ball.

Some clubs are intentionally used to make contact with the ground after ball impact. If the clubhead makes contact with the ground prior to the hit or during the dwell time, the clubhead will contort and alter the Sweet Line characteristics. This can be minimized by altering the face base of the clubhead to be sharp allowing the clubhead to Plow or Plow Through the ground that will offer minimum resistance, reduce clubhead bounce and other related stresses. The Plow can be an integral part of the Flat Base and extend into the Toe and Heel areas that will also contact the ground.

Since a small percentage of ball hits occur on the intended Two Sweet Spots or True Sweet Spot, clubhead design considerations are dependant upon balance clubhead parameters that relies upon influencing planes and axes within the clubhead to minimize losses.

There are Two Club Planes in a golf club that intersect, the Swing Plane and the Face Orientation Plane, not taking into account Control Mass or Orbital Mass that subdivides in equal masses. The Control Mass dominates from the Swing Plane to the heel, whereas the Orbital Mass dominates from the Swing Plane to the toe. The Control Mass, compared to its counterpart has less hitting area, more bell shaped with narrower sigma limits.

There are up to Five Clubhead Planes, Clubhead Swing Plane, Clubhead Face Orientation Plane, Clubhead Weight Distribution Plane, Ground Sweet Spot Plane, and Tee Sweet Spot Plane.

There are up to Five Clubhead Axes, the Center Of Gravity Axis, Clubhead Central Axis, True Sweet Spot Axis, Ground Sweet Spot Axis, and Tee Sweet Spot Axis.

These planes and axes are interrelated and arced during ball impact, wherein any three, or more, intersecting combinations create a master reference called the Bernie Point.

There are two main Power Distribution Curves, the Sweet Line Power Curve, and the Weight Distribution Face Line Power Curve that can be statistically plotted, in conjunction with the weight balancing of the Four Face Quadrants, called the upper, lower, toe and heel quadrants, with the respective curves called, for example, the Upper Toe Power Curve. The ideal resultant four quadrant bell shaped curves will be similar, less skewed, flatter, and with wide sigma levels with this patent.

The Clubhead Weight Distribution Plane has a Weight Distribution Face Line that has an angular limit between below horizontal and near vertical.

Clubhead weight distribution is of prime concern, for example, the more Lower Toe Weighting, and Less Heel Weighting, results in a more horizontal angle of the Sweet Line, that separates the Ground Target Line from the Tee Target Lines allowing more lateral movement of the clubhead between these lines, whereas, Upper Toe Weighting results in a more vertical angle that can result in the Weight Distribution Face Line being perpendicular to the Sweet Line.

These clubhead planes and axes divide up into eight quadrants that can form any angular relationship by weight distribution. One position will be shown when all planes and axes are at ninety degrees to each other, having better balancing forces, all in relationship with the True Sweet Spot. Another position will be shown when the Clubhead Weight Distribution Plane is horizontal.

Clubhead stability is enhance by a Quadrant Weight Distribution system that extends the weight not only to the sides, but also from the face to the back of the clubhead, while reference to base weighting, creating True Perimeter Weighting, otherwise known as Balanced Weighting, Split Weighting, Barbell Weighting, Seesaw Weighting, Elongated Toe Heel Weighting, or used up to an Eight Quadrant Weight Zones. The clubhead weight distribution can be at the extremities of the quadrants, away from, and balanced, in reference to the Bernie Point, with the clubhead designed accordingly.

When the Clubhead Face Orientation Plane is parallel to the clubhead face results in Weight Balanced Striking Power.

When the Clubhead Weight Distribution Axis is parallel to the clubhead face results in Balanced Weight Distribution.

Whereby, having the Clubhead Face Orientation Plane and the Clubhead Weight Distribution Axis back away from the face, in reference to the Swing Plane, and optimumly to the clubheads center Bernie Point results in Push Angle Reduction, or P.A.R., and the angular reduction of losses, with the ability of a clubhead miss hitting a ball to be more forgiving.

The Bernie Point is a variable located on the Center Of Mass Axis, and is used to determine any or all of the Six Sweet Spots.

The Bernie Point establishes all of the transferral of forces that are applied, in determining the resultant ball struck parameters.

To summarize this disclosure, when the Swing Plane is perpendicular to the Clubhead Face Orientation Plane, and perpendicular to Clubhead Weight Distribution Plane, all being perpendicular or parallel in relationship to the clubhead face, results in optimization of the Bernie

Point Push Angle Reduction, and in relationship to the weight balancing of the Four Face Quadrants, and the True Sweet Spot or Two Sweet Spots face centering, whereby incorporating a Flat Base, when fitted to a golfer in his Stance Triangle, hence aligning to a ball and a target, produces the First Ultimate Golf Club design. The Second Ultimate Golf Club design is produced when the Clubhead Weight Distribution Plane is horizontal.

The Bernie Line and Bernie Point are the Deity in golf club design technology.

The invention relies on the Law of Physics that all Symmetrical and Nonsymmetrical instruments in their Dynamic Impact State have from one to an infinite number of Swing Planes and further that a symmetrical instrument Swing Plane has a Center Of Mass and Center Of Mass Axis, all within that instrument and further there is a perimeter line around each of these Swing Planes. Further the forward object striking portion of this perimeter impact line is called the Sweet Line that contains an Infinite Number of Sweet Spots or impact points with varying power levels.

A Nonsymmetrical instrument has a Swing Plane where the Center Of Mass Axis and Center Of Mass are within or may be external to that instruments mass, such as a golf club, which has a Swing Plane, and other planes and axes. The Swing Plane is subdivided and creates a perimeter line around the clubhead called the Bernie Line that encompasses the clubhead. The Bernie Line is subdivided into three major lines, Sweet Line, directional Target Line, and Training Line. The Sweet Line is Angular, varies between vertical and horizontal, and is the clubheads central striking axis. The Sweet Line contains a number of Infinite Sweet Spots with varying power levels, in which Six Sweet Spots are claimed, Ground Sweet Spot, Tee Sweet Spot, Maximum Sweet Spot, Optimum Sweet Spot, True Sweet Spot, and Minimum Sweet Spot. The

Ground Sweet Spot and the Tee Sweet Spot are called the Two Sweet Spots that are referenced from the Maximum Sweet Spot to determine the lengths to hit a ball, called the Ground Hit Line and the Tee Hit Line. Above the Ground Sweet Spot and the Tee Sweet Spot we are unable to hit a ball, these lines are called the Ground Dead Line and the Tee Dead Line. These Two Sweet Spots can be identified to any number, but primarily to two ball heights on conventional clubs, or referenced to, and identified to any parameter change or changes. The Two Sweet Spots, are referenced to the two ball heights are the basis for determining the Ground Vertical Line and the Tee Vertical Line, and can be translated onto the top of the clubhead, respectively forming the Ground Target Line and Tee Target Line that are used to align the clubhead to the ball in the intended direction, whereby being in relationship to the Target Line and face contour.

The Ground Target Line and Tee Target Line connect to the Ground Training Line and the Tee Training Line, in relationship to the Training Line, that connects to the bottom of the Ground Vertical Line and the Tee Vertical Line, forming the Clubhead Ground Plane and Clubhead Tee Plane. As has been described the Ground Vertical Line and Tee Vertical Line are vertically displaced from each other requiring a later shift of the clubhead to coincide with that balls impact point height. In order to insure that the ball impact point height is constant when the ball is on a Tee a tool may be used. The true Sweet Spot can be used to identify a clubhead alignment to strike a ball at one specific height, requiring no lateral shifting of the clubhead. The Optimum Sweet Spot may or may not coincide with any of the Six Sweet Spots. The True Sweet Spot is designed to hit a ball at one height, but can facilitate a Second Base used to strike a ball at another height and have Automatic Loft. The True Sweet Spot can also be used to strike a ball at both heights, incorporating a clubhead having a Heel Base or Toe Base. The Sweet Line is

controlled by the Three Triangles in golf, Stance Triangle, Club Triangle, and Alignment Triangle. The Sweet Line and derivatives exists on all clubs, that will change with parameter changes, but can be identified to each club and golfer's parameters. the present invention determines the location. The Sweet Line and derivatives will not change with a clubhead having a Flat Base that is fitted to a golfer's parameters, unless the clubhead is held incorrectly, or in another plane that becomes Automatically Hooded. The Hooding can facilitate a Hood Stop.

The Swing Plane has a Control Mass and an Orbital Mass. The Center Of Mass Axis can be moved back away from the clubhead face by shaft relocation called Centerset, or Optimum Centerset. If the Sweet Line was vertical, no lateral shifting of the clubhead would be required to strike a ball at any height. If the Sweet Line was more horizontal, more lateral shifting of the clubhead would be required to strike a ball at a different height. The Sweet Line can incorporate Horizontal Sweet Line Bulge, Vertical Sweet Line Roll, or Flat Sweet Line. The Sweet Line height can be referenced, to establish the top height of a clubhead. The Sweet Line height can be maximized on the clubhead called a Sweet Line Peak, or any derivatives. The Sweet Line deviation is also controlled by clubhead ground contact that is minimized by bottom face edge Plow. The Ground Target Line and Tee Target Line parallax and depth perception can be eliminated by incorporating an EyeAligner on the clubhead or ball. The Ground Target Line and Tee Target Line on conventional clubheads, can incorporate an Eyes Over The Ball focusing Antiparallaxer to eliminate parallax and depth perception.

The Swing Plane has several planes and axes that can be related to it. The Swing Plane contains several planes including Five Clubhead Planes, Clubhead Swing Plane, Clubhead Face Orientation Plane, Clubhead Weight Distribution Plane, Ground Sweet Spot Plane, and Tee

Sweet Spot Plane. The Clubhead Weight Distribution Plane is formulated by a Quadrant Weight Distribution system, consisting of Eight Quadrant Weight Zones, with a Weight Distribution Face Line. These aforementioned planes contain several axes including Five Clubhead Axes, the Center Of Gravity Axis, Clubhead Weight Distribution Axis, True Sweet Spot Axis, Ground Sweet Spot Axis, and Tee Sweet Spot Axis. These planes and axes establish the Bernie Point, that when moved back away from the clubhead face results in Push Angle Reduction, otherwise known as P.A.R. The Bernie Point and all related planes and axes, relate to the Impact Swing Radius Arc and Impact Swing Radius Length. The Weight Distribution Face Line has two main Power Distribution Curves, the Sweet Line Power Curve, and the Weight Distribution Face Line Power Curve, in conjunction with Four Face Quadrants. The Sweet Line Angulation is primarily affected by Lower Toe Weighting, Extended Upper Toe Weighting and the Clubhead Weight Distribution Plane that when the Swing Plane Clubhead Face Orientation Plane and Clubhead Weight Distribution Plane are at right angles to each other, creates a Bernie Point. When the Swing Plane is perpendicular to the clubhead face, the result is an optimization of the Bernie Point and Push Angle Reduction. Henceforth incorporating Centerset and in relationship to the Quadrant Weight Distribution and the True Sweet Spot or Two Sweet Spots in consideration to face centering, whereby incorporating a Flat Base and fitting that golf club to a golfer in his Stance Triangle whereby aligning the correct Ground Vertical Line or the Tee Vertical Line in conjunction with a Target Line derivative to a ball, produces the First Ultimate Golf Club design.

All of the relationships to Clubhead Weight Distribution Plane when horizontal, results in the Second Ultimate Golf Club design. The Sweet Spot and its related Center Of Gravity terminology known throughout the centuries has been true but only applicable to a golf club Head

without its components, and must be distinguished between New Technology, because it is not true and not applicable in use to a complete golf club, with all of its components, which requires New Terminology such as True Sweet Spot and Two Sweet Spots.

It is often asked what Sweet Spot means or refers to with regard to a club head. FIG. 14, illustrates one method for locating the conventional Sweet Spot 22 of a club head. The figure illustrates a club head without a shaft or grip or other components. The club head is shown with the club head face facing downward and balanced on a Sweet Line Locator 77. The club head will only balance at one point. In the present invention I have gone beyond Sweet Spot to Sweet Line. My Sweet Line determines a broad range of ideal locations on the clubhead for impact with a golf ball to obtain maximum results and reduce adverse influences on control, accuracy, precision and distance. By having the ball struck at the correct impact point on the clubhead the ball will travel along it's intended path with the least amount of dispersion. The likelihood of the ball hooking or slicing is also reduced to a minimum. In the event the player actually desires the ball to hook or slice this may be accomplished by adjusting the clubhead position for impact, experience and practice would determine the exact adjustment to use.

The clubhead markings become a focused visual aid indicating exact clubhead positioning, when the golf club is swung. Most players take several preparatory swings prior to the swing that strikes the ball. The focused visual aid may be used in the preparatory swings using a blade of grass or other object in place of the ball. The focused visual aid is the Target Line which is also used as a training aid.

FIG. 15, illustrates a clubhead with Sweet Line 4 shown as a diagonal line, the Sweet Line 4 is raised to indicate both Angular Bulge 39' and Angular Roll 40'. Horizontal Bulge is the

curvature of the clubhead face surface extending from the Toe to the Heel. Vertical Roll is the curvature of the clubhead face surface extending from the top Crown of the clubhead to the bottom Sole of the clubhead. Horizontal Bulge and Vertical Roll are typically related to the club head Sweet Spot. Angular Bulge is a curved and raised area on the golf clubhead face surface that follows the Sweet Line at the Sweet Line's diagonal. Angular Roll is a curved and raised area on the golf clubhead face surface that is perpendicular to the Sweet Line. My invention has the Angular Bulge and Angular Roll related to the Sweet Line. Angular Grooves 80 are shown parallel to the Sweet Line 4 and therefore at a diagonal. As an alternative the Angular Grooves could be perpendicular to the Sweet Line 4. It is also possible to have the Angular Grooves form a fan shaped design pointing upward with the fan shape center line being the Sweet Line 4 or downward with the fan shape center line being the Sweet Line 4. Also shown is Round Base 81. In addition Sweet Line Peak 34, also known as Hump, is shown together with Eyealigner 59, also known as Target Line.

FIG. 16, illustrates a conventional iron 67 shown in dotted lines and an iron with a curved base 81. Shown on the iron with curved base 81 is a Sweet Line Peak 34. Also shown is Sweet Line 4 as it would appear on both the conventional iron 67 and the iron with curved base 81.

FIG. 17, illustrates an iron with the Center Grip Shaft 42 aligned to point of contact for a ball resting on the ground at Ground Sweet Spot 10, which is the Sweet Line Centerset 48'. The Sweet Line Centerset is having the shaft and grip center line align with a specific point on the Sweet Line when the clubhead face surface is viewed from the toe of the clubhead. In FIG. 17 the specific point is the Ground Sweet Spot. The hosel can be positioned in order that the alignment takes place for any spot on the Sweet Line. The alignment forms a plane that includes

the Shaft Center Line, the point selected on the Sweet Line and the horizontal line on the clubhead face surface that runs thru the point selected on the Sweet Line. Forward Press is when the Shaft Center Line is tilted off the vertical toward the intended direction of travel of the ball.

The following portion of the summary has been added to the summary submitted with Application 09/797,357.

Additional Summary

This invention involves improvements to a club head component and designing a golf club clubhead after the shaft and grip are installed. The invention explains the existence and use of several balance planes used to locate the ideal point or points of contact on a golf clubhead. This invention further explains and demonstrates conventional incorrect clubhead alignment and correct clubhead alignment. The invention also demonstrates how the ideal point or points of contact and alignment can be determined incorporating parallax correction or elimination. The invention includes tools, markings, methods of location and methods of use, regarding the ideal point or points of contact.

When a shaft, grip and club head are mounted together, a clubhead is created as opposed to a club head component. When the components are combined the club head face Sweet Spot is no longer the ideal point of contact. When the components are combined the ideal point or points of contact form a diagonal line that this inventor refers to as the clubhead face Sweet Line. As the loft angle of the clubhead is decreased the diagonal line will approach a vertical line (for example a putter). Conversely as the loft is increased the diagonal line will come close to being a horizontal line (for instance a sand wedge). As the loft changes the balance plane changes. A golf club contains a balance plane that subdivides the clubhead with an angular line across the face, the

inventor calls this line the Sweet Line. It has been substantiated by several methods that the balance plane and Sweet Line exists on all golf club clubheads. It is this inventor's contention that a ball struck on the Sweet Line will travel further and with less dispersion than a ball struck at the traditional Sweet Spot designed club head component, as the traditional Sweet spot is determined without the other components (shaft and grip) attached. It would be possible to locate the Sweet Spot to coincide with the Sweet Line at the geometric center of the clubhead face. This Sweet Line contains an infinite number, or multiple Sweet Spots, of which, the inventor calls two of the points, Two Sweet Spots. These Two Sweet Spots can be identified to strike a ball being either on the ground or tee. These Two Sweet Spots are called the Ground Sweet Spot and the Tee Sweet spot. The Sweet Line also has a variable True Sweet Spot that primarily changes with shaft deflection during the swing. By varying the weight of the various components, or length of the shaft, etc., the Sweet Line can be designed to be at any location on the clubhead face. A balance plane and its derivative Sweet Line exists on all golf clubs. The existence of a balance plane and Sweet Line on all golf clubs mandates the way all golf clubs should be designed and manufactured, with related methodology of use.

Clubhead feedback of past art golf clubs has been limited to the golfer seeing the clubhead go through as a blur and having the sole of the clubhead bouncing off the turf hence leaving a mark indicating the approximate position of the clubhead. Increasing the clubhead feedback is possible by incorporating clubhead markings that a player can see as a visual aid, at address and during the swing to predict hook and slice and compensate for shaft deflection, while also allowing the golfer to improve upon clubhead position, open face, closed face, swing plane, back swing, attack swing, impact dwell time, swing arcs and swing angles.

This invention includes identifying the Sweet Spot Target Line on Club Head Component top and or face surfaces with and without parallax correction. This invention also includes markings on the top and or face surfaces that act as additional or separate visual and or alignment aids. Also included are methods for locating the markings and tools that may be used in the process.

In order to provide the player with a easily found visual reference on the club head top or face surface it is necessary to first locate the club head component Sweet Spot. Next find the axis of rotation and balance point on the club head face surface, called the Center of Gravity or Sweet Spot. Then place the club head at the angle of intended use. Next extending vertically from the Sweet Spot locate a point at the intersection of the club head face surface and club head top surface. This point, called the Incorrect Target Line Front Point, would be the ideal visual reference point for the player to determine the desired point of contact for the club head face surface to make contact with the golf ball, provided that the players eyes were positioned directly over the club head.

Now, with the club head component balanced on the Sweet Spot use a Conventional Instrument To Measure Angle Of Slope Above The Horizontal and draw a line on the club head top surface from the Incorrect Target Line Front Point. The resulting line would be the Incorrect Sweet Spot Target Line. This line would be the actual visual reference point for the player to determine the desired point of contact for the club head to make contact with the golf ball, as adjusted for the angle of intended use. provided that the players eyes were positioned directly over the club head and golf ball.

It is the purpose of the present invention to provide the golfer with markings on the club

head face and/or top surfaces to act as visual aids to assist the golfer.

Markings on the face surface assist the golfer in determining the ideal point or points of contact with the golf ball regardless of the position of the golf ball, on the ground, on a tee or any other position. Markings on the top surface assist the golfer in aligning the golf club head to insure that the face surface is essentially perpendicular to the desired path of flight for the golf ball. It is critical that the face surface be essentially perpendicular to the desired path of flight for the golf ball at impact or the golf ball may hook, slice or follow some other undesired path.

As a further visual aid to the Golfer it is possible to place markings on the top surface of the Golf Club Head that provides the Golfer with a visual aid to align the club head face surface with the golf ball at impact. Some golfers tend to adjust the golf club to overcome a tendency that the golfer has to slice or hook. In a perfect world the golf club face surface should be essentially perpendicular to the path of flight that the golfer desires the golf ball to take, upon impact. Although this does not take into account the swing plane curvature, golf club head position, shaft torque, golf ball torque, and other phenomenon that occur during the golf ball dwell time. If the golfer finds that the golf ball is consistently hooking or slicing, when a straight path of flight is desired, the golfer will adjust the golf club to have the golf club face surface at a slight angle off of the perpendicular to the desired golf ball path of flight. The individual golfer will do the adjustment depending on the correction desired. In some instances the golfer is trying to overcome not only an improper angle of the golf Club face surface in relation to the desired path of flight for the golf ball, but also an improper point of impact on the golf club face surface. In the foregoing situation the golfer should first confirm that the point of impact is the desired point of impact.

Traditionally Golf Club components, such as the Club head, Shaft and Grip, are individual designed and then assembled together that results in a Golf Club. The following novel modes will be presented in the design of a Golf Club that facilitates all components with predetermined factors, such as weight, size, length etc., and then designing any or all components, that can be related to the Golfers Body as an extension of the Golf Club, and/or the Golfers Swing Plane.

Traditionally, the Maximum Club Head Face Height on any Golf Club is found between the club head Toe and the center of the club head face Sweet Spot. The Maximum Club Head Face Height offers an optimum area in which to hit a golf ball, that can be related to a point, vertical plane, line, angular line, bell curve or otherwise. This patent will present a novel design that has the Maximum Club Face Height located at the aforementioned club head face Sweet Spot that can be referenced in a vertical plane. Also presented will be a novel design that has the Maximum Club Face Height located between the club head Heel and the center of the club head face Sweet Spot.

Balls hit at any point, or series of points, on a clubhead face surface can be plotted as a skewed bell curve.

Traditionally Golf Club components, such as the Club head, Shaft and Grip, are individual designed and then assembled together that results in a Golf Club. Several novel modes will be presented in the design of a Golf Club that facilitates all components, that can also be related to the Golfers Body and the Golfers Swing Plane.

In past art the Maximum Club Head Face Height on any Golf Club is found only between the club head Toe and the center of the club head face Sweet Spot, commonly known as the center of gravity, geometric center or otherwise. Novel art relocates the Maximum Club Head

Face Height to the club head center that can be relative to a vertical plane. Novel art also relocates the Maximum Club Head Face Height to the area between the club head Sweet Spot and the Heel.

The markings, previously described and displayed separately on the Golf Club Head top surface, being the Target Line (Incorrect Sweet Spot Target Line and Parallax Corrected Sweet Spot Target Line) with Sight Line (Incorrect Sight Line and Correct Sight Line) and Face Line (square, open or closed position), may be combined to be displayed together. This combined visual aid allows the player to more clearly see how to best align the Golf Club Head for impact with the Golf Ball, and also during the swing.

The present invention is intended to illustrate that there are multiple ideal points of contact that form a diagonal line, called the Sweet Line, on the Golf Club Head face surface. The Sweet Line must essentially align to the golf ball impact point, with the ball being in whatever location or position. A ball hit on the Sweet Line will travel further and with less dispersion, than hit at any other location on the club head face surface. It is further the intent of the present invention to demonstrate that the Golfer must move the Golf Club Head forward, in the direction of the toe, of the Club Head Component, as the Golf Ball is raised from the ground by a Tee or other means, to have the appropriate ideal point of contact on the Golf Club Head face surface to make proper contact with the Golf Ball, which repudiates the traditional concept of a vertical clubhead movement to coincide with a vertical ball movement.

A Sweet Spot and Sweet Line Locator Face Tapping and Balance Plane Locator Tool for locating the Sweet Spot on a Golf Club Head component, or Sweet Line on a Golf Club Head Face, or on a golf club with a traditionally designed head. This tool can also be incorporated in locating

the True Sweet Spot on the Sweet Line, face Target Line and top Target Line.

While the invention will be described in connection with a preferred embodiment, it will be understood that I do not intend to limit the invention to that embodiment. On the contrary, I intend to cover all alternatives, modifications and equivalents as may be included within the spirit and scope of the invention as defined by the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective and interior view of a golf club wood, with a Shaft Grip Centerline 42, showing swing plane 1, club head swing plane 29, center of mass axis 3, , and alignment lines including: Bernie line 2; Sweet line 4, with 4* indicating the length; Target line 5, with 5* indicating the length; Ground Vertical line 12; Tee Vertical line 13; Ground Target line 14; Tee Target line 15; Perimeter line 28; and Training line 31. Also shown is Maximum Sweet Spot 16, Control Mass 20, Orbital Mass 21, Flat base 23, Bernie Point 30, Flat face 50 and Center of Mass 66.

FIG. 2 is a perspective and interior view of a baseball bat with a swing plane and compositions. Shown are Optimum Sweet Spot 17, Swing Plane Arc 27 and Swing Plane Radius 36.

FIG. 3 is a side view of an iron clubhead to a ball on the ground, impact point relationship and Flat Base. Shown are Ground 6, Ball Ground Height 8, Ball Impact Point 9, Ground Sweet Spot 10, 10* being Ground Sweet Spot Height, Ball Diameter 37 and Ball Set Point 38.

FIG. 4 is a side view of an iron clubhead to ball on a tee, impact point relationship. Shown are Ball Tee height 7, and Tee Sweet Spot 11, with 11* showing Tee Sweet Spot Height.

FIG. 5 is a front view of an iron embodying the present invention. Shown are 10** indicates Ground Hit Line, 10*** indicates Ground Dead Line, 11** indicates Tee Hit Line, 11*** indicates Tee Dead Line, Hood 24, Hood Stop 25, True Sweet Spot 26, Hood Point 32, Sweet Line Height 33, Sweet Line Peak 34, Eyealigner 59, and Conventional Iron 67.

FIG. 6 is a perspective view of a conventional wood head. Shown are Sweet Spot 22, Sweet Spot Alignment Spot 35, Horizontal Face Bulge 64 and Face Bulge 65.

FIG. 7 is a perspective view of a novel wood clubhead. Shown are Lower Toe Weight 18, Upper Toe Weight 19, Sweet Line Horizontal Face Bulge 39, Sweet Line Face Vertical Roll 40, Heel Base 47, Centerset 48, Plow 49 and Toe Base 61.

FIG. 8 is a perspective and interior view of a partially embodied wood clubhead with planes and axes correlation to a Weight Distribution Face line parallel to a Flat Base. Shown are Second Base 43, Face Orientation Plane 51, Clubhead Face Orientation Plane 52, Weight Distribution Plane 53, Weight Distribution Axis 54, True Sweet Spot Axis 55, Ground Sweet Spot Axis 56, Tee Sweet Spot Axis 57 and Weight Distribution Face Line 58.

FIG. 9 is a perspective and interior view of a partially embodied wood clubhead with an EyeAligner, perpendicular planes and axes correlation. Shown is Maximum Ball Compression Area 60.

FIG. 10 shows a perspective view of the RighTee-HeighTee tool 78, indicating Adjustable Tee Height 45, Hinged Foldup 46, Ball Mark Repair Tool 62, Ball Marker 63, Groove Cleaner 69, Clubhead Face Cleaning Pad 70 and Tee Head Retainer 90.

FIG. 11, illustrates the Dynamic Clubhead Impacting To The Golf Ball Method. Shown are A Golf Club 71, Spherical Quadrant Shifter 72 and a Club Torque Responder 73.

FIG. 12, illustrates the Static Clubhead Loft Angle Plumb Bobbing Method. Shown is Plumb Bob 74.

FIG. 13, illustrates the Static Horizontal Clubhead Face Balancing Method. Shown are the Club Grip End 75, a Level Platform 76, the Clubhead Face 79 and the Sweet Line Locator Tool 77. Also shown are Donut Shaped Stabilizer Base Member 87 and Rigid Rod 88.

FIG. 14, illustrates one method for locating the conventional Sweet Spot 22 of a club head. The figure illustrates a club head without a shaft or grip or other components. The club head is shown with the club head face facing downward and balanced on a Sweet Line Locator 77. The club head will only balance at one point.

FIG. 15, illustrates a clubhead with Sweet Line 4 shown as a diagonal line, the Sweet Line 4 is raised to indicate both angular bulge 39' and angular roll 40'. Angular Grooves 80 are shown parallel to the Sweet Line 4 and therefore at a diagonal. Also shown is Round Base 81. In addition Sweet Line Peak 34, also known as Hump, is shown together with Eyealigner 59, also known as Target Line.

FIG. 16, illustrates a conventional iron 67 shown in dotted lines and an iron with a curved base 81. Shown on the iron with curved base 81 is a Sweet Line Peak 34. Also shown is Sweet Line 4 as it would appear on both the conventional iron 67 and the iron with curved base 81.

FIG. 17, illustrates an iron with the Center Grip Shaft 42 aligned to point of contact for a ball resting on the ground at Ground Sweet Spot 10, which is the Sweet Line Centerset 48'. The Sweet Line Centerset is having the shaft and grip center line align with a specific point on the Sweet Line when the clubhead face surface is viewed from the toe of the clubhead. In FIG. 17 the specific point is the Ground Sweet Spot.

FIG. 18 shows the Lie Angle Paper 82, Lie Angle Base Corner 83, Level Platform 76 and Hole In Level Platform 84.

FIG. 19 shows Lie Angle Paper 82, a Golf Club 71, Level Platform 76, Sweet Line Locator 77, Donut Shaped Stabilizer Base Member 87 and Golf Club Top Surface 85. Also shown in dotted lines is Shaft Grip Centerline 42. The Golf Club 71 is shown with the Shaft

Grip Centerline 42 at the angle of intended use.

FIG. 20 shows Lie Angle Paper 82, a Golf Club 71, Level Platform 76, Sweet Line Locator 77, Donut Shaped Stabilizer Base Member 87, Golf Club Top Surface 85, Ground Target Line 14 and Level 86. Also shown in dotted lines is Shaft Grip Centerline 42. The Golf Club 71 is shown with the Shaft Grip Centerline 42 at the angle of intended use, as adjusted for parallax.

FIG. 21 shows Golf Club 71, Level Surface 76, Instrument That Reads The Angle Of Slope Above The Horizontal 89, Ground Target Line 14 and Tee Target Line 15. Also shown in dotted lines is Shaft Grip Centerline 42. The Golf Club is shown at the angle of intended use.

FIG. 22 shows Golf Club 71, Level Surface 76, Instrument That Reads The Angle Of Slope Above The Horizontal 89, Level 86, Ground Target Line 14 and Tee Target Line 15. Also shown in dotted lines is Shaft Grip Centerline 42. The Golf Club is shown at the angle of intended use as increased for parallax.

FIG. 23 shows the Instrument That Reads The Angle Of Slope Above The Horizontal 89. As shown this is a standard instrument readily available on the market. The instrument will read 90 degrees when the long shaft is vertical and 0 degrees when the long shaft is horizontal.

The following portion of the Brief Description of the Drawings has been added to the Brief Description of the Drawings submitted with Application 09/797,357.

FIG. 24 shows a side view of the Club Head Component 92, Sweet Spot Axis 95 is shown in dotted lines, the Sweet Spot 22 is shown on the Clubhead Face 79 which is downward facing, the Club Head Component 92 is shown balanced on the Rigid Rod 88.

FIG. 25 shows a top view of the Club Head Component 92, from FIG.25, the Club Head Component 92 having been rotated about the Sweet Spot Axis 95, also shown is Sweet Spot 22

still making contact with the Rigid Rod 88.

FIG. 26 shows a front view of the Club Head Component 92, also shown is Sweet Spot 22, Instrument to Measure Angle of Slope Above the Horizontal 89, Incorrect Target Line Front Point 97, Center Grip Shaft 42, Level Platform 76 and Shaft 93. The Instrument to Measure Angle of Slope Above the Horizontal 89 is shown with the long portion aligned parallel with the Center Grip Shaft 42, the resulting angle will indicate the slope or angle of intended use. The Instrument to Measure Angle of Slope Above the Horizontal 89 is shown in a second position aligned with the long portion in the vertical. The edge of the long portion is at the Sweet Spot 22 resulting in the Incorrect Target Line Front Point 97 being located as shown.

FIG. 27 shows the Club Head Component 92, positioned as in FIG. 26, balanced on the Rigid Rod 88 at the Sweet Spot 22. Also shown is Instrument to Measure Angle of Slope Above the Horizontal 89 on Level Platform 76, aligned with the long portion in the vertical. The edge of the long portion is positioned at Incorrect Target Line Front Point 97, with the edge forming the Incorrect Sweet Spot Target Line 96.

FIG. 28 shows a top view of the Club Head Component 92, indicating how the Incorrect Sweet Spot Target Line 96 may be expanded in either or both directions with a resulting Sweet Spot Target Line Range 98. Also shown is Target Line Length 5*.

FIG. 29 shows a front view of the Club Head Component 92, as set up at angle of intended use, also shown is Sweet Spot 22, Instrument to Measure Angle of Slope Above the Horizontal 89, Incorrect Target Line Front Point 97, Incorrect Sight Line 99, Center Grip Shaft 42, Level Platform 76 and Shaft 93. The Instrument to Measure Angle of Slope Above the Horizontal 89 is aligned with the corner at the Sweet Spot 22 and the long portion at the Correct Sight Line 100, as a result the Parallax corrected Target Line Front Point 97* is located as

shown. The Instrument to Measure Angle of Slope Above the Horizontal 89 can be aligned anywhere on the Sight Line 100 provided that the Sight Line 100 passes thru Sweet Spot 22. The Parallax corrected Target Line Front Point 97* is also at an end of EyeAligner 59 as shown in prior drawings including FIG.s 5, 7 and 15.

FIG. 30 shows the Club Head Component 92, positioned as in FIG. 28, balanced on the Rigid Rod 88 at the Sweet Spot 22. Also shown is Instrument to Measure Angle of Slope Above the Horizontal 89 on Level Platform 76, aligned with the long portion in the vertical. The edge of the long portion is positioned at Parallax Corrected Target Line Front Point 97*, with the edge forming the Parallax Corrected Sweet Spot Target Line 96*. The Parallax Corrected Sweet Spot Target Line 96* may be expanded, as was Incorrect Sweet Spot Target Line 96 in FIG. 29, in either direction or both as indicated with the resulting Sweet Spot Target Line Range 98. Both Incorrect Sweet Spot Target Line 96 and Parallax Corrected Sweet Spot Target Line 96* are shown for comparison.

FIG. 31 shows the Golf Club Component 92 balanced on a balance support device 88, with the balance support device 88 positioned on the level platform 76, all as previously described. The sweet spot 22, on the club head face surface 79, has been determined as described previously. A vertical support means 109 is shown having a vertical support means pivot point 109* and a vertical support means slot 109**. Also shown is a Conventional Instrument To Measure Angle Of Slope Above The Horizontal 89, frictionally secured to the vertical support means 109. The Instrument is positioned in order that the long edge is parallel to the Level Platform 76. Draw a line on the Club Head Component 92 Top Surface 79** being the Face Line 101.

FIG. 32 illustrates Conventional Instrument To Measure Angle Of Slope Above The

Horizontal 89 being at an angle with the long edge being closer to the Face Surface 79, at the hosel 79*. The Face Line that is drawn is The Face Line Closed 101*.

FIG. 33 illustrates Conventional Instrument To Measure Angle Of Slope Above The Horizontal 89 being at an angle with the long edge being further from the Face Surface 79, at the hosel 79*. The Face Line that is drawn is The Face Line Open 101**

FIG. 34 illustrates the Club Head Component 92 with a Shaft 93 inserted at the Hosel 79*. Also shown is a Golf Ball 37*, with an arrow indicating the direction of intent. Also shown is the desired point of anticipated contact, at address, being at the Sweet Spot 22. Note that the Face Line 101, as marked in FIG. 31, provides a visual aide indicating that the line and Club Head Face Surface 79 are square to the direction of intent.

FIG. 35 illustrates the Club Head Component 92 with a Shaft 93 inserted at the Hosel 79*. Also shown is a Golf Ball 37*, with an arrow indicating the direction of intent. Also shown is the desired point of anticipated contact, at address, being at the Sweet Spot Face Closed 22*. Note that the Face Line Closed 101*, as marked in FIG. 32, provides a visual aide indicating that the line is square to the direction of intent, with the Club Head Component 92 in the Face Closed position to the Golf Ball 37*.

FIG. 36 illustrates the Club Head Component 92 with a Shaft 93 inserted at the Hosel 79*. Also shown is a Golf Ball 37*, with an arrow indicating the direction of intent. Also shown is the desired point of anticipated contact, at address, being at the Sweet Spot Face Open 22**. Note that the Face Line Open 101**, as marked in FIG. 33, provides a visual aide indicating that the line is square to the direction of intent, with the Club Head Component 92 in the Face Open position to the Golf Ball 37*.

FIG. 37 is a plan view of the top surface of the Golf Club Head Component 92 with

Incorrect Sweet Spot Target Line 96 together with Face Line 101. Also shown is Incorrect Target Line Front Point 97. Also shown are Sweet Spot 22, Rigid Rod 88, Level Platform 76 and Sweet Spot Target Line Range 98.

FIG. 38 is a plan view of the top surface of the Golf Club Head Component 92 with Incorrect Sweet Spot Target Line 96, with Parallax Corrected Sweet Spot Target Line 96* together with Face Line 101. Also shown is Parallax Corrected Target Line Front Point 97*. Also shown are Sweet Spot 22, Rigid Rod 88 and Level Platform 76.

FIG. 39 is a plan view of the top surface of the Golf Club Head Component 92 with Incorrect Sweet Spot Target Line 96, Target Line Closed Face 96' for a Closed Face with Face Line Closed Face 101*. Also shown is Incorrect Target Line Front Point 97 and Face Line 101. Also shown are Sweet Spot 22, Rigid Rod 88 and Level Platform 76.

FIG. 40 is a plan view of the top surface of the Golf Club Head Component 92 with Incorrect Sweet Spot Target Line 96, Parallax Corrected Sweet Spot Target Line Closed Face 96*' for a Closed Face with Face Line Closed Face 101*. Also shown is Parallax Corrected Target Line Front Point 97* and Face Line 101. Also shown are Sweet Spot 22, Rigid Rod 88 and Level Platform 76.

FIG. 41 is a plan view of the top surface of the Golf Club Head Component 92 with Incorrect Sweet Spot Target Line Open Face 96" for an Open Face with Face Line Open Face 101**. Also shown is Incorrect Target Line Front Point 97 and Face Line 101. Also shown are Sweet Spot 22, Rigid Rod 88 and Level Platform 76.

FIG. 42 is a plan view of the top surface of the Golf Club Head Component 92 with Incorrect Sweet Spot Target Line 96, Parallax Corrected Sweet Spot Target Line Open Face 96*" for an Open Face with Face Line Open Face 101**. Also shown is Parallax Corrected Target

Line Front Point 97* and Face Line 101. Also shown are Sweet Spot 22, Rigid Rod 88 and Level Platform 76.

FIG. 43 is broken down into three drawings, namely 43A, 43B and 43C.

FIG.43A is a side view that indicates the alignment of a Club Head Component 92 to Golf Ball On The Ground 37*'. As shown Sweet Spot 22 aligns to Ball Impact Point 9.

FIG.43B is a side view that indicates, in dotted lines, the alignment of a Club Head Component 92 to Golf Ball On A Tee 37*'. As shown Sweet Spot 22 aligns to Ball Impact Point 9. Also shown is Tee 38*.

FIG.43C is a front view that indicates, in solid lines, the alignment of a Club Head Component 92 to Golf Ball On The Ground 37*', and indicates, in dotted lines, the alignment of Club Head Component 92 to Golf Ball On A Tee 37*'. Also shown is Tee 38*. As shown Sweet Spot 22 aligns to Ball Impact Point 9 for both the solid lines and for the dotted lines.

FIG. 44 is broken down into three drawings, namely 44A, 44B and 44C.

FIG.44A is a side view of Golf Club 71 that indicates the alignment of a Club Head Of Golf Club 92* to Golf Ball On The Ground 37*'. As shown is Ground Sweet Spot 10 aligned to Ball Impact Point 9. Also shown is Center Grip Shaft 42.

FIG.44B is a side view, that shows in dotted lines, Golf Club 71 that indicates the alignment of a Club Head Of Golf Club 92* to Golf Ball On Tee 37*'. As shown is Tee Sweet Spot 11 aligned to Ball Impact Point 9. Also shown is Center Grip Shaft 42. Also shown is Tee 38*.

FIG.44C is a front view that indicates Golf Club 71 with Center Grip Shaft 42., in solid lines, indicating the alignment of a Club Head Of Golf Club 92* to Golf Ball On The Ground 37*'. Also shown is Sweet Line 4, as shown Ground Sweet Spot 10, which is on Sweet Line 4,

aligns with Golf Ball On The Ground 37*' at Ball Impact Point 9. As shown the Tee Sweet Spot 11' is not aligned to Ball Impact Point 9. Also shown is Golf Club 71 with Center Grip Shaft 42., in dotted lines, indicating the alignment of Club Head Of Golf Club 92* to Golf Ball On Tee 37*". Also shown is Sweet Line 4, as shown Tee Sweet Spot 11, which is on Sweet Line 4, aligns with Golf Ball On Tee 37*" at Ball Impact Point 9. Also shown is Tee 38*. As shown the Tee Sweet Spot 10' is not aligned to Ball Impact Point 9.

Note that the Club Head Of Golf Club 92* is moved forward, in the Toe direction, as the Golf Ball is raised off the Ground.

FIG. 45 shows the Sweet Spot and Sweet Line Locator Face Tapping and Balance Plane Locator Tool 105 in a vertical position, comprised of Rigid Rod 88 and Golf Ball 37*, with Flat Edge Rigid Rod Upward End 91* and Concaved Rigid Rod Upward End 91**.

FIG. 46 shows an iron Club Head Component 92, with a flat Club Head Face 79 in the horizontal position, balancing at the Sweet Spot 22, on the Flat Rigid Rod Upward End 91* of Sweet Spot and Sweet Line Locator Face Tapping and Balance Plane Locator Tool 105, in coincidence with the Sweet Spot Axis 95.

FIG. 47 shows a wood Club Head Component 92, with a curved Club Head Face 79 in the horizontal position, balancing at the Sweet Spot 22, on the Concaved Rigid Rod Upward End 91** of Sweet Spot and Sweet Line Locator Face Tapping and Balance Plane Locator Tool 105, in coincidence with the Sweet Spot Axis 95.

FIG. 48 shows a Golf Club 71, with the Club Grip End 75 balancing on Rigid Rod 88, with flat Club Head Face 79 in the horizontal position, balanced on the Sweet Line 4 of Club Head Face 79, on the Flat Edge Rigid Rod Upward End 91* of Sweet Spot and Sweet Line Locator Face Tapping and Balance Plane Locator Tool 105.

FIG. 49 shows a Golf Club 71, with the Club Grip End 75 balancing on Level Platform 76, with curved Club Head Face 79 in the horizontal position, balancing on the Sweet Line 4, on the Caved Rigid Rod Upward End 91** of Sweet Spot and Sweet Line Locator Face Tapping and Balance Plane Locator Tool 105.

FIG. 50 shows a perspective view of Component Club Head 92, with the Curved Rigid Rod Upward End 91** of Sweet Spot and Sweet Line Locator Face Tapping and Balance Plane Locator Tool 105, square against Club Head Face 79 at the Sweet Spot 22 being at the correct designed loft and angle. Also shown is Curved Rigid Rod Upward End 91** of Sweet Spot and Sweet Line Locator Face Tapping and Balance Plane Locator Tool 105 square against Club Head Face 79 at several other locations.

FIG. 51 shows front view of Golf Club 71, being suspended vertically from Suspension Point 108, in the center of Club Grip End 75, with Golf Club Axis 95'. Also shown is Clubhead of Golf Club 92*, Sweet Spot 22, Golf Club Head Upper Toe Edge Area 107*, Golf Club Head Upper Heel Edge Area 107**, Golf Club Head Lower Toe Edge Area 107***, and Golf Club Head Lower Heel Edge Area 107****. Also shown is the Balance Plane 1* which has a leading edge or frontal line on the club head face called the Sweet Line 4, with the Sweet Line 4 having the limits of Maximum Sweet Spot 16 and Minimum Sweet Spot 16*.

DESCRIPTION OF THE PREFERRED EMBODIMENT

First locate conventional club head component center of gravity, normally referred to as the Sweet Spot, said Sweet Spot having an axis of rotation, on a club head component, said club head having a bottom surface, top surface and face surface, but no grip or shaft or other components, as follows:

Find a balance support device, said balance support device being from the group of devices that can be positioned to have an upward extending surface with cross sectional area small enough that it forms a point of balance, the balance support upward extending surface may form a point or have a curvature. The balance support device could also be the sweet line locator described as follows: said sweet line locator having a donut shaped stabilizer base member said stabilizer base member having a flat bottom surface, a top surface, a continuous opening of uniform diameter running from the flat bottom surface to the top surface and with a frictional device positioned at the top surface at the continuous opening of uniform diameter; and a rigid rod positioned within the stabilizer base member continuous opening and being of sufficient diameter to engage frictionally with the frictional device at the stabilizer base member top surface, further said rigid rod being of sufficient length to extend both above and below the stabilizer base member said rigid rod having an upward end and a downward end and a center line ;

Next, hold the balance support device in order that the upward extending surface is aimed in a vertical direction;

Next, place the club head on the balance support device upward extending surface with

the club head face surface facing downward;

Next, move the club head around on the balance support device upward extending surface until the club head is balanced; and

Figs 24 thru 30 illustrate the steps for one method to determine the location of markings on the top surface of the Golf Club Head Component to provide the golfer with a visual aide for aligning the golf club head with the golf ball at impact.

Fig. 24 and Fig. 25 show the club head face surface being marked at the point of contact with the balance support device, Rigid Rod 88, upward extending surface, when the Club Head Component 92 is balanced being the conventional club head component center of gravity, normally referred to as the Sweet Spot 22 on Club Head Face 79. The Club Head Component 92 can freely rotate around the Sweet spot Axis 95

Fig. 26 shows the Club Head Component 92, showing the club head placed with bottom surface resting on a Level Platform 76 and insert a Shaft 93, or other straight shaft like device into club head at hosel, then using a Conventional Instrument To Measure Angle Of Slope Above The Horizontal 89, adjust club head to have center line of shaft, Center Grip Shaft 42, at angle of intended use. Using Conventional Instrument To Measure Angle Of Slope Above The Horizontal 89 place said Instrument against club head face surface at point marked as Sweet Spot 22 and mark the point that is vertically above the Sweet Spot 22, being Incorrect Target Line Front Point 97, at intersection of club head face surface and club head top surface;

In Fig. 27, shows the Club Head Component 92, showing the club head being returned to balance position with the Sweet Spot 22 on balance support device Rigid Rod 88, on level platform 76, and using Conventional Instrument To Measure Angle Of Slope Above The

Horizontal 89 place said Instrument at point 97, as marked, and draw a line on club head top surface, said line being Incorrect Sweet Spot Target Line 96.

Fig. 28 shows the Club Head Component 92, showing that the Incorrect Sweet Spot Target Line 96 may be extended either toward the toe or toward the heel, or equally in both directions to make the line broader and more visually apparent. As broadened the Incorrect Sweet Spot Target Line 96 now falls within Incorrect Sweet Spot Target Line Range Limits 98. The resulting Target Line length 5* is shown.

The Incorrect Sweet Spot Target Line 96 and Incorrect Sweet Spot Target Line Range Limits 98 as located by the foregoing process would result in the appropriate location for use as a visual aid if the player were viewing the Club Head Component 92 from a position that is the upward vertex from the Club Head Component 92. This is the fallacy of most conventional golf club head designs. In reality the player will view the Club Head Component 92 from a non vertical angle. This offset view causes a parallax factor that optically moves the Incorrect Sweet Spot Target Line 96 and Incorrect Sweet Spot Target Line Range Limits 98 to appear to be at a location that is different from the desired location for alignment of the desired point of impact, being Sweet Spot 22, on the Club Head Component 92, with a ball. Therefore to allow the player to correctly align the desired point of impact, on the Club Head Component 92, with the ball, it is necessary to reposition the Incorrect Sweet Spot Target Line 96 and Incorrect Sweet Spot Target Line Range Limits 98 on the Club Head Component 92 for parallax correction.

Fig. 29 shows the Club Head Component 92 showing the incorrect eye alignment, indicating the Incorrect Parallax Sight Line 99, as viewed at the Incorrect Target Line Front Point 97. Also shown is the Correct Sight Line 100, as viewed at the Correct Target Line Front

Point 97*, using Parallax correction. Using a Conventional Instrument To Measure Angle Of Slope Above The Horizontal 89, adjust club head to have center line of shaft, Center Grip Shaft 42, at angle of intended use, on Level Platform 76. Using Instrument To Measure Angle Of Slope Above Horizontal 89 place the corner base of said Instrument against club head face surface at point marked as Sweet Spot 22, or at any point along the Line Of Sight 100, then adjust the Instrument to be at Correct Sight Line 100 angle to correct for the Parallax Angle and mark the point, that is diagonally in line with the Sweet Spot 22, now being the Parallax Corrected Target Line Front Point 97*, at intersection of club head face surface and club head top surface;

In Fig. 30, shows the Club Head Component 92, showing the club head being returned to balance position with the Sweet Spot 22, on balance support device Rigid Rod 88, as located above and using Conventional Instrument To Measure Angle Of Slope Above The Horizontal 89, on Level Platform 76, place said Instrument at point 97*, as marked, draw a line on club head top surface, said line being Parallax Corrected Sweet Spot Target Line 96*. Or as an alternate the Incorrect Sweet Spot Target Line 96 that begins at 97 can be repositioned to be Parallax Corrected Sweet Spot Target Line 96* and begin at 97*, Parallax Corrected Sweet Spot Target Line 96* will appear to be parallel to Incorrect Sweet Spot Target Line 96, when viewed by the player. Once again the Parallax Corrected Sweet Spot Target Line 96* may be enlarged in either or both directions with a resulting Sweet Spot Target Line Range Limits 98.

The Sweet Spot Target Line, because it is a contrasting color, provides a visual aid that the player sees as he swings the golf club during his actual or practice swing. The Sweet Spot Target Line is seen during the swings as a focused image in the correct position for contact with

the golf ball. This image will provide a visual aid. Traditionally, during the practice swing the player is being prepared for the actual swing. The player develops a tempo and mode. Sometimes the club head bounces off the ground. The player develops a feeling of positioning. With conventional golf club head designs the player cannot predict whether he will hook or slice the ball. With the Parallax Corrected Sweet Spot Target Line the player sees a highly focused dot during their swing. The player usually will perform some practice swings using a blade of grass as the target (simulating a golf ball). If the focused dot passes over the blade of grass the alignment should be correct. In the event the focused dot appears to be further away from the player than the blade of grass the swing would be predicted to have resulted in a hook. In the event the focused dot appears to be closer to the player than the blade of grass the swing would be predicted to have resulted in a slice.

The club head face surface basically should be “square” to the golf ball during the swing and at impact. In the event the club head face surface is closed (angled toward the player) or open (angled away from the player) the ball may either hook or slice. The focused dot will appear as a blurred dot in the event the club head face surface is either open or closed during the swing.

During the swing the shaft will deflect and twist resulting in a change in club head face angle. The player may compensate for the change in angle by observing, and improving upon the optimum focusing of the dot during that specific swing.

In addition the player can observe the path of the swing both ways, meaning that the player can see, with peripheral vision, the focused dot during the back swing, the down swing, during impact and after impact (follow thru). Therefore the player is able to confirm that the

swing is following a desired path, that the club head is properly positioned for impact, at impact and continues along the desired path during follow thru.

Figs 31 thru 33 illustrate a method to determine the location of markings on the top surface of the Golf Club Component to provide with a visual aide for aligning the squareness of the golf club head to the golf ball at address, for the direction of intent. The player may alter the squareness of the golf club head to the golf ball, to overcome the individual's swing maladies for the direction of intent, resulting in the face being open or closed at impact to cause the golf ball to follow the intended path of flight when the golf club head makes impact with the golf ball. As shown in Fig. 31 Club Head Component 92 is balanced on a balanced on a rigid rod 88. As shown in Figs. 31 thru 33, the following steps are followed to locate the markings. Figs. 34 thru 36 illustrate the manner in which the markings would be used to alter the squareness of the golf club head to the golf ball at address and also at impact and further indicates the point of impact to accomplish the intended path of flight for the golf ball.

Fig. 31 shows the Golf Club Component 92 balanced on a balance support device 88, with the balance support device 88 positioned on the level platform 76, all as previously described. The sweet spot 22, on the club head face surface 79, has been determined as described previously. A vertical support means 109 is shown having a vertical support means pivot point 109* and a vertical support means slot 109**. Also shown is a Conventional Instrument To Measure Angle Of Slope Above The Horizontal 89, frictionally secured to the vertical support means 109. The Instrument is positioned in order that the long edge is parallel to the Level Platform 76. Draw a line on the Club Head Component 92 Top Surface 79** being the Face Line 101.

Fig. 32 illustrates Conventional Instrument To Measure Angle Of Slope Above The Horizontal 89 being at an angle with the long edge being closer to the Face Surface 79, at the hosel 79*. The Face Line that is drawn is The Face Line Closed 101*.

Fig. 33 illustrates Conventional Instrument To Measure Angle Of Slope Above The Horizontal 89 being at an angle with the long edge being further from the Face Surface 79, at the hosel 79*. The Face Line that is drawn is The Face Line Open 101**

Fig. 34 illustrates the Club Head Component 92 with a Shaft 93 inserted at the Hosel 79*. Also shown is a Golf Ball 37*, with an arrow indicating the direction of intent. Also shown is the desired point of anticipated contact, at address, being at the Sweet Spot 22. Note that the Face Line 101, as marked in Fig. 31, provides a visual aide indicating that the line and Club Head Face Surface 79 are square to the direction of intent.

Fig. 35 illustrates the Club Head Component 92 with a Shaft 93 inserted at the Hosel 79*. Also shown is a Golf Ball 37*, with an arrow indicating the direction of intent. Also shown is the desired point of anticipated contact, at address, being at the Sweet Spot Face Closed 22*. Note that the Face Line Closed 101*, as marked in Fig. 32, provides a visual aide indicating that the line is square to the direction of intent, with the Club Head Component 92 in the Face Closed position to the Golf Ball 37*.

Fig. 36 illustrates the Club Head Component 92 with a Shaft 93 inserted at the Hosel 79*. Also shown is a Golf Ball 37*, with an arrow indicating the direction of intent. Also shown is the desired point of anticipated contact, at address, being at the Sweet Spot Face Open 22**. Note that the Face Line Open 101**, as marked in Fig. 33, provides a visual aide indicating that the line is square to the direction of intent, with the Club Head Component 92 in

the Face Open position to the Golf Ball 37*.

Fig. 37 shows the Golf Club Head Component 92 with Incorrect Sweet Spot Target Line 96 together with Face Line 101. The Face Line 101 is located in accordance with the steps illustrated in Fig. 31. Also shown is Incorrect Target Line Front Point 97. The Incorrect Sweet Spot Target Line 96 is located in accordance with the steps illustrated in Figs. 24 thru 28. Fig. 39 shows the Incorrect Target Line Front Point 97 acts as a pivot point for the Incorrect Sweet Spot Target Line Closed Face 96' for a Closed Face with Face Line Closed Face 101*. Fig. 41 shows the Incorrect Target Line Front Point 97 that act as a pivot point for the Incorrect Sweet Spot Target Line Open Face 96" for an Open Face with Face Line Open Face 101**.

Fig. 38 shows the Golf Club Head Component 92 with Parallax Corrected Sweet Spot Target Line 96* together with Face Line 101. The Face Line 101 is located in accordance with the steps illustrated in Fig. 31. Also shown is Parallax Corrected Target Line Front Point 97*. The Parallax Corrected Sweet Spot Target Line 96* is located in accordance with the steps illustrated in Figs. 24 thru 27, 29 and 30. Fig. 40 shows the Parallax Corrected Target Line Front Point 97* which acts as a pivot point for the Parallax Corrected Sweet Spot Target Line 96*' for a closed face with Face Line Closed Face 101*. Fig 42 shows the Parallax Corrected Target Line Front Point 97* on an open Face with Face Line Closed Face 101** and for the Parallax Corrected Sweet Spot Target Line Open Face 96*" for an Open Face with Face Line Open Face 101**.

The present invention is intended to illustrate that there are multiple ideal points of contact that form a diagonal line on the Golf Club Head face surface. It is further the intent of the present invention to demonstrate that the Golfer must move the Golf Club Head forward, in

the direction of the toe, of the Club Head Component, as the Golf Ball is raised from the ground by a Tee or other means, to have the appropriate ideal point of contact on the Golf Club Head face surface to make proper contact with the Golf Ball. The Golfer must also move in the direction of the toe in order to maintain the same lie angle and swing plane. The antiquated practice that the Golfer should raise the Club Head Component when the Golf Ball is raised from the ground by a Tee or otherwise is illustrated by Figs 43 A, B and C. It should be noted that when the Golfer raises the Club Head Component there will be a change in the lie angle and swing plane. My invention, that the Club head Component should be moved forward, in the direction of the toe, as the Golf Ball is raised from the ground by a Tee or otherwise, in order for the appropriate point of contact on the Club Head Component to make contact with desired point of contact on the Golf Ball is illustrated by Figs 44 A, B and C.

Fig. 43 is broken down into three drawings, namely 43A, 43B and 43C.

Fig.43A is a side view that indicates the alignment of a Club Head Component 92 to Golf Ball On The Ground 37*'. As shown Sweet Spot 22 aligns to Ball Impact Point 9.

Fig.43B is a side view that indicates, in dotted lines, the alignment of a Club Head Component 92 to Golf Ball On A Tee 37*". As shown Sweet Spot 22 aligns to Ball Impact Point 9. Also shown is Tee 38*.

Fig.43C is a front view that indicates, in solid lines, the alignment of a Club Head Component 92 to Golf Ball On The Ground 37*', and indicates, in dotted lines, the alignment of Club Head Component 92 to Golf Ball On A Tee 37*". Also shown is Tee 38*. As shown Sweet Spot 22 aligns to Ball Impact Point 9 for both the solid lines and for the dotted lines.

As can be seen the Club Head is adjusted vertically to compensate for the Golf Ball being

raised by the Tee. The present Golfer's assumption is that the Sweet Spot remains at one and only one location on the Golf Club Head face surface. This assumption is false as is illustrated by Fig.s 44 A, B and C.

Fig. 44 is broken down into three drawings, namely 44A, 44B and 44C.

Fig.44A is a side view of Golf Club 71 that indicates the alignment of a Club Head Of Golf Club 92* to Golf Ball On The Ground 37*'. As shown is Ground Sweet Spot 10 aligned to Ball Impact Point 9. Also shown is Center Grip Shaft 42.

Fig.44B is a side view, that shows in dotted lines, Golf Club 71 that indicates the alignment of a Club Head Of Golf Club 92* to Golf Ball On Tee 37*''. As shown is Tee Sweet Spot 11 aligned to Ball Impact Point 9. Also shown is Center Grip Shaft 42. Also shown is Tee 38*.

Fig.44C is a front view that indicates Golf Club 71 with Center Grip Shaft 42., in solid lines, indicating the alignment of a Club Head Of Golf Club 92* to Golf Ball On The Ground 37*'. Also shown is Sweet Line 4, as shown Ground Sweet Spot 10, which is on Sweet Line 4, aligns with Golf Ball On The Ground 37*' at Ball Impact Point 9. As shown the Tee Sweet Spot 11' is not aligned to Ball Impact Point 9. Also shown is Golf Club 71 with Center Grip Shaft 42., in dotted lines, indicating the alignment of Club Head Of Golf Club 92* to Golf Ball On Tee 37*''. Also shown is Sweet Line 4, as shown Tee Sweet Spot 11, which is on Sweet Line 4, aligns with Golf Ball On Tee 37*'' at Ball Impact Point 9. Also shown is Tee 38*. As shown the Tee Sweet Spot 10' is not aligned to Ball Impact Point 9.

As can be seen the Club Head Of Golf Club 92* is moved forward, in the Toe direction, as the Golf Ball is raised off the Ground in order that the appropriate Sweet Spot on the Club

Head Component face surface makes contact with the Golf ball at the Ball Impact Point 9.

Fig. 45A shows the Sweet Spot and Sweet Line Locator Face Tapping and Balance Plane Locator Tool 105 in a vertical position, comprised of Rigid Rod 88 and Golf Ball 37*, with Flat Edge Rigid Rod Upward End 91* and 45B shows the Sweet Spot and Sweet Line Locator Face Tapping and Balance Plane Locator Tool 105 in a vertical position, comprised of Rigid Rod 88 and Golf Ball 37*, with Concaved Rigid Rod Upward End 91**.

Fig. 46 shows an iron Club Head Component 92, with a Flat Face 79' in the horizontal position, balancing at the Sweet Spot 22, on the Flat Rigid Rod Upward End 91* of Sweet Spot and Sweet Line Locator Face Tapping and Balance Plane Locator Tool 105, in coincidence with the Sweet Spot Axis 95. The Club Head Component 92 can freely rotate on the Sweet Spot Axis 95 while being supported by the Flat Rigid Rod Upward End 91*.

Fig. 47 shows a wood Club Head Component 92, with a Curved Face 79" in the horizontal position, balancing at the Sweet Spot 22, on the Concaved Rigid Rod Upward End 91** of Sweet Spot and Sweet Line Locator Face Tapping and Balance Plane Locator Tool 105, in coincidence with the Sweet Spot Axis 95. The Club Head Component 92 can freely rotate on the Sweet Spot Axis 95 while being supported by the Curved Rigid Rod 91**, that is part of the Sweet Spot and Sweet Line Locator Face Tapping and Balance Plane Locator Tool 105, at Sweet Spot 22.

Fig. 48 shows a Golf Club 71, with the Club Grip End 75 balancing on Rigid Rod 88, with Flat Face 79' in the horizontal position, that can be balanced at any location on the Sweet Line 4, while being supported by the Flat Edge Rigid Rod Upward End 91* of Sweet Spot and Sweet Line Locator Face Tapping and Balance Plane Locator Tool 105. The Flat Face 79' will

not properly balance on the Flat Edge Rigid Rod Upward End 91*, at Sweet Spot 22 or any other spot on the Flat Face 79',. except on the Sweet Line 4.

Fig. 49 shows a Golf Club 71, with the Club Grip End 75 balancing on Level Platform 76, with Curved Face 79" in the horizontal position, that can be balanced at any location on the Sweet Line 4, while being supported by the Concaved Edge Rigid Rod Upward End 91* *of Sweet Spot and Sweet Line Locator Face Tapping and Balance Plane Locator Tool 105. The Curved Face 79" will not properly balance on the Concaved Edge Rigid Rod Upward End 91**, at Sweet Spot 22 or any other spot on the Curved Face 79", except on the Sweet Line 4.

Fig 50 shows a perspective view of Component Club Head 92, with the Curved Rigid Rod Upward End 91** of Sweet Spot and Sweet Line Locator Face Tapping and Balance Plane Locator Tool 105, square against Curved Face 79" at the Sweet Spot 22 being at the correct designed loft and angle. Also shown is Curved Rigid Rod Upward End 91** of Sweet Spot and Sweet Line Locator Face Tapping and Balance Plane Locator Tool 105 square against Club Head Face 79 at several other locations that results in varying loft and face angles.

Fig. 51 shows front view of Golf Club 71, being suspended vertically from Suspension Point 108, in the center of Club Grip End 75, that creates an axis of rotation called Golf Club Axis 95'. Also shown is Clubhead of Golf Club 92*, Sweet Line 4, Sweet Spot 22, Golf Club Head Upper Toe Edge Area 107*, Golf Club Head Upper Heel Edge Area 107**, Golf Club Head Lower Toe Edge Area 107***, and Golf Club Head Lower Heel Edge Area 107****. By facilitating the use of the Sweet Spot and Sweet Line Locator Face Tapping and Balance Plane Locator Tool, hold the Rigid Rod whereby using the Golf Ball 37* to strike, or tap, the golf club head face or edge areas. By tapping the Upper and Lower Toe Edge Areas will result in the

clockwise twisting of the Golf Club about Golf Club Axis 95'. By tapping the Golf Club Head Upper and Lower Heel Edge Areas will result in the counter clockwise twisting of Golf Club 71 about Golf Club Axis 95. Whereas, tapping at the Minimum Sweet Spot 16*, and the Maximum Sweet Spot point, being the limits of the Sweet Line 4, or tapping anywhere along Sweet Line 4 will result in the Golf Club 71 going directly back in a Balance Plane 1*. The Balance Plane 1* has a leading edge on the clubhead face called the Sweet Line 4.